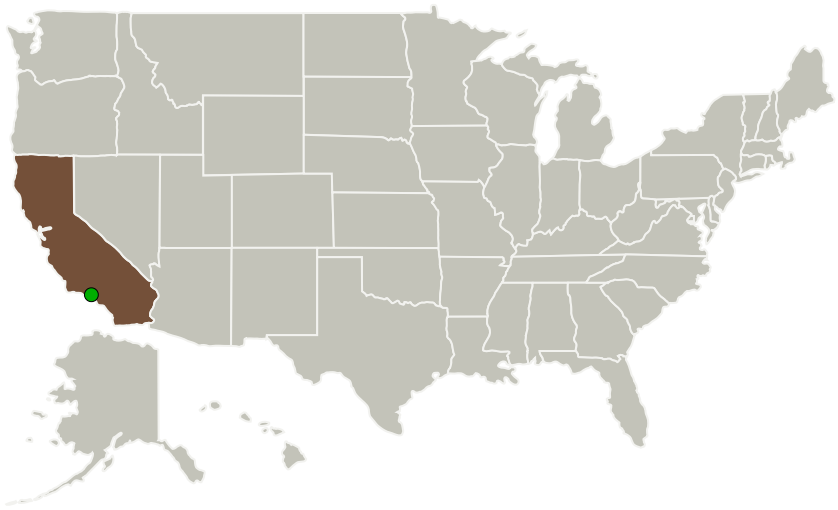
Fabrication and Measurement of Precision Structures for External Occulter Optical Edges, Phase I

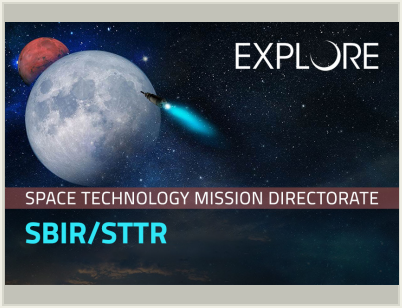
Completed Technology Project (2012 - 2012)

Project Introduction

This project proposes to develop an occulter optical edge and optical edge measurement verification system suitable for astrophysics missions including JWST and the Occulting Ozone Observatory (O3). The optical edge has tight cross-section requirements in order to produce the correct diffraction as light passes over the edge. It is also of importance is the optical edge profile tolerance. This requires precision machining and that the optical edge be thermally stable. Key technical challenges lie in manufacturing an optical edge with a cross-section appropriate for an occulter as well as in measuring that edge to the degree of precision required. Due to the thermal stability requirements, innovative materials or combinations of materials must be used. The focus of this research will be to produce an optical edge with the required cross-section and to measure that edge accurately. Advanced machining techniques will be investigated which may include milling, electrical discharge machining, grinding, and laser machining. Measurement techniques will include scanning laser displacement transducer and computerized measurement machine. This technology could be extended to a full scale optical edge with the correct profile in a Phase II program.

Primary U.S. Work Locations and Key Partners





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Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
Vanguard Space Technologies, Inc	Lead Organization	Industry	San Diego, California
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations
California

Project Transitions

February 2012: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138148)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Vanguard Space Technologies, Inc

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

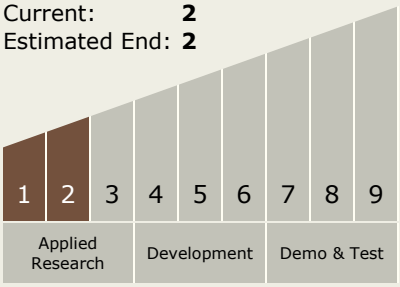
Carlos Torrez

Principal Investigator:

Mark Schlocker

Technology Maturity (TRL)

Start: **1**
Current: **2**
Estimated End: **2**



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Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.1 Optical Communications
    - TX05.1.6 Optimetrics

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System